The activity of the Model group of the JMMC

IAU Interferometry group meeting

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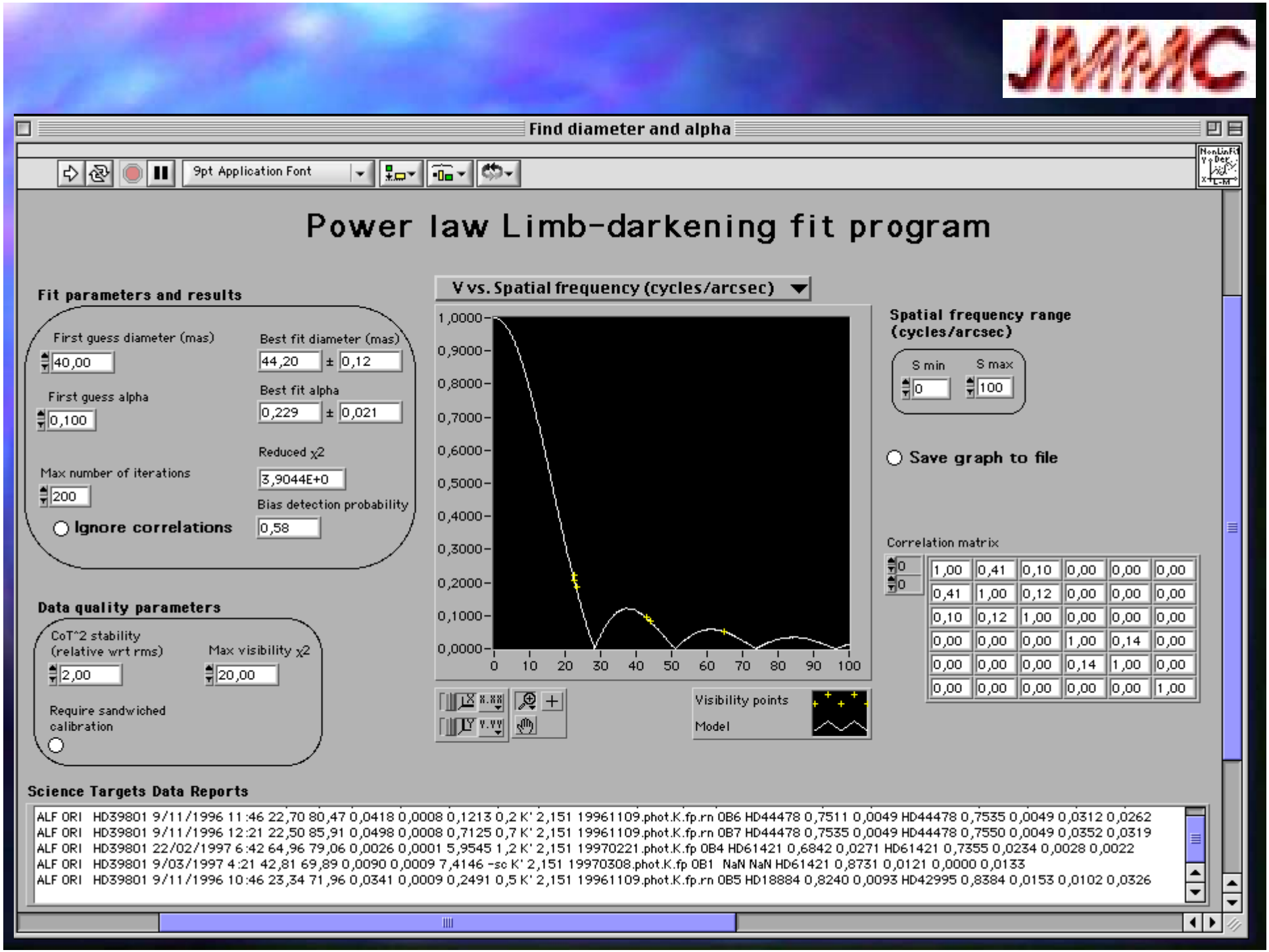
Background and goals

- The group was created in September 2001
- Major French interferometry groups are presented

- Missions:
  - state of the art of the expertise in France and make experts work together
  - define a tool to fit interferometric data with simple models. Be prepared for a second series of schools on VLTI
  - study advanced methods of data fitting for the next generations of tools developped by JMMC

Group skills

		Obs. Nice	Univ. Nice	Obs. Lyon	Obs. Paris	Obs. Grenoble
Geometrical models						
Astrophysical models						
Instrumental models	instrument					
	χ^2					
	error bars					
Image restoration						


JMMC
Find diameter and alpha
9pt Application Font
Power law Limb-darkening fit program
Fit parameters and results
First guess diameter (mas)
40,00
Best fit diameter (mas)
44,20 ± 0,12
First guess alpha
0,100
Best fit alpha
0,229 ± 0,021
Reduced χ2
3,9044E+0
Max number of iterations
200
Bias detection probability
0,58
Ignore correlations
Data quality parameters
CoT^2 stability (relative wrt rms)
2,00
Max visibility χ2
20,00
Require sandwiched calibration
V vs. Spatial frequency (cycles/arcsec)
1,0000
0,9000
0,8000
0,7000
0,6000
0,5000
0,4000
0,3000
0,2000
0,1000
0,0000
0 10 20 30 40 50 60 70 80 90 100
Visibility points
Model
Spatial frequency range (cycles/arcsec)
S min
0
S max
100
Save graph to file
Correlation matrix
1,00 0,41 0,10 0,00 0,00 0,00
0,41 1,00 0,12 0,00 0,00 0,00
0,10 0,12 1,00 0,00 0,00 0,00
0,00 0,00 0,00 1,00 0,14 0,00
0,00 0,00 0,00 0,14 1,00 0,00
0,00 0,00 0,00 0,00 0,00 1,00
Science Targets Data Reports
ALF ORI HD39801 9/11/1996 11:46 22,70 80,47 0,0418 0,0008 0,1213 0,2 K' 2,151 19961109.phot.K.fp.rn 0B6 HD44478 0,7511 0,0049 HD44478 0,7535 0,0049 0,0312 0,0262
ALF ORI HD39801 9/11/1996 12:21 22,50 85,91 0,0498 0,0008 0,7125 0,7 K' 2,151 19961109.phot.K.fp.rn 0B7 HD44478 0,7535 0,0049 HD44478 0,7550 0,0049 0,0352 0,0319
ALF ORI HD39801 22/02/1997 6:42 64,96 79,06 0,0026 0,0001 5,9545 1,2 K' 2,151 19970221.phot.K.fp 0B4 HD61421 0,6842 0,0271 HD61421 0,7355 0,0234 0,0028 0,0022
ALF ORI HD39801 9/03/1997 4:21 42,81 69,89 0,0090 0,0009 7,4146 -sc K' 2,151 19970308.phot.K.fp 0B1 NaN NaN HD61421 0,8731 0,0121 0,0000 0,0133
ALF ORI HD39801 9/11/1996 10:46 23,34 71,96 0,0341 0,0009 0,2491 0,5 K' 2,151 19961109.phot.K.fp.rn 0B5 HD18884 0,8240 0,0093 HD42995 0,8384 0,0153 0,0102 0,0326

Methodology in 3 questions

- What is the link between the object and the observables?
- What is the best way to link the parameters to the observables (criterium to minimize)?
- What is the optimum way to perform the minimization of the criterium?

Current work

• Series of meetings to define and better focus the work being done

• **Four main tasks:**

  •***Formalism of the relationship between the object and the model*** (object, instrument, data reduction algorithms, atmopshere, …). Analysis is currently limited to GI2T, AMBER and MIDI.

Investigators : M. Tallon, I. Tallon-Bosc, D. Mourard, R. Petrov, G. Perrin

Current work

• ***Optimum χ^2.*** Define the statistically meaningful function to minimize that takes into account V^2, closure phases, phases, differential phases. Define optimum minimization algorithm.

Investigators: É. Tatulli, A. Chelli, É. Thiébaut

• ***Correlations.*** identify correlated noises and errors in the data to define the right statistics and take them into account in the computation of final estimated quantities. Sources of correlation: atmospheric noise, common calibrators

Investigator: G. Perrin (a paper has been submitted to A&A)

Current work

• ***Data format.*** The unified data format of IAU must take into account the work of the group.

Investigators: A. Chelli, D. Mourard

Schedule

• The immediate goal is to be ready for the next VLTI school (early 2004) on data reduction and analysis to provide a well defined and prepared tool using simple classical models.

• The global goal is to provide the VLTI community and other communities with a good quality tool to perform the analysis of the data

• First delivery is expected for the end of 2003. Code will be part of ASPRO.